The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MICHAEL R. BRUCE and RAMA R. GORUGANTHU

Appeal No. 2004-0690
Application No. 09/386,112

ON BRIEF

Before KIMLIN, KRATZ and DELMENDO, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-16.

Claim 1 is illustrative:

1. For a semiconductor device that includes a semiconductor die having a circuit side and bulk silicon in an [sic] back side opposite the circuit side, a method for detecting a defect at a surface in the die, comprising:

locating a first beam splitter for optical manipulation relative to the back side of the semiconductor die;

directing light of a known wavelength at the beam splitter, wherein the first beam splitter is adapted to direct a first beam

of light into the back side of the semiconductor die which reflects a second beam of light back;

redirecting the second beam to a second beam splitter, the second beam splitter generating third and fourth beams of light; and

analyzing the third and fourth beams of light, including comparing a relational factor that is a function of the two beams of light with a reference and detecting therefrom a surface defect in the die.

The examiner relies upon the following reference as evidence of obviousness:

Marx et al. (Marx) 5,880,838 Mar. 9, 1999

Appellants' claimed invention is directed to a method and system for detecting a defect in a semiconductor die having a circuit side and a bulk silicon back side. The invention includes a first beam splitter for directing a beam of light into the back side of the die, which beam is then reflected to a second beam splitter which generates a pair of beams that are analyzed and compared to light reflected from a die not having a surface defect. A typical defect in the die includes a defect in a material type or composition.

Appealed claims 1-16 stand rejected under 35 U.S.C. § 112, first paragraph, enablement requirement. Claims 1-16 also stand rejected under 35 U.S.C. § 112, second paragraph. In addition,

claims 1, 2, 7 and 9-15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Marx.

We have thoroughly reviewed the respective positions advanced by appellants and the examiner. In so doing, we find that the examiner's rejections under 35 U.S.C. § 112, first and second paragraphs, are not well founded. We do agree with the examiner, however, that the claimed subject matter would have been obvious to one of ordinary skill in the art within the meaning of § 103 in view of the applied prior art. Accordingly, while we will not sustain the examiner's § 112 rejections, we will sustain the examiner's § 103 rejection for essentially those reasons expressed by the examiner.

We consider first the examiner's rejection under § 112, first paragraph. In essence, it is the examiner's position that the specification does not describe how the non-reflected reference beam is combined with the reflected beam after being split by the first beam splitter. However, as correctly pointed out by appellants, the appealed claims do not require any such combination of the reflected and non-reflected beams. Appellants point to the specification which describes a comparative analysis made on the reflected beam that is split into the third and fourth beams by a second beam splitter. On the other hand, the

examiner has not met the initial burden of establishing that one of ordinary skill in the art would be unable to practice the claimed invention without undue experimentation in light of the specification disclosure and state of the prior art. In re Strahilevitz, 668 F.2d 1229, 1232, 212 USPQ 561, 563 (CCPA 1982); In re Armbruster, 512 F.2d 676, 677, 185 USPQ 152, 153 (CCPA 1975). For instance, even if the claimed method necessarily included combining the reflected and non-reflected beams, the examiner has not demonstrated that one of ordinary skill in the art would not be enabled to do so.

We will also not sustain the examiner's rejection of the appealed claims under § 112, second paragraph, since the examiner has fallen prey to reading the claims in a vacuum rather than in light of the supporting specification and state of the art. In re Sneed, 710 F.2d 1544, 1548, 218 USPQ 385, 388 (Fed. Cir. 1983); In re Moore, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). The examiner reasons that "[b]ecause the back side of the semiconductor die is the only surface positively claimed 'which reflects a second light beam' no defects are imprinted onto the reflected second light beam" (sentence bridging pages 5 and 6 of Answer). However, it is clear from the present specification that the beam travels through the back side of the die before

encountering the defective surface that reflects the beam. We also disagree with the examiner that claims 1, 10 and 11 are incomplete "as to how any profile of the circuit side of the die is formed for comparison as there is no interference claimed" (page 6 of Answer, second paragraph). The claims encompass the method disclosed in the specification which develops a profile of the circuit side by analyzing the reflected beam that is split into third and fourth beams.

We will sustain the examiner's rejection under 35 U.S.C. § 103 over Marx. Appellants do not dispute the examiner's factual determination that Marx discloses a method for measuring the dimensions of a semiconductor die utilizing the presently claimed light source, first beam splitter, second beam splitter and means for analyzing the third and fourth beams of light. It is appellants' contention that the examiner has not provided any evidence for using Marx "in connection with defect detection in a semiconductor die, as claimed in the present invention" (page 5 of principal brief, second paragraph). However, inasmuch as Marx essentially discloses appellants' instrumentation and system for determining "structural parameters," such as surface dimensions and type of material, for microelectronic devices, we fully concur with the examiner that one of ordinary skill in the art

would have found it obvious to establish the standard for such a structural parameter for comparison with the parameters of manufactured devices. In our view, Marx clearly suggests such a use at column 4, lines 21 et seq., wherein a reference structure of known structural parameters, such as the material of the structure, is used to determine unknown structural parameters of other devices. Manifestly, using a system of the type claimed for determining unknown structural parameters would readily facilitate the determination of whether the tested device is defective.

As for the failure of Marx to disclose the claimed thinning of the back side of the die before testing, we agree with the examiner that appellants' specification evidences that such a step was well-known in the art of analyzing semiconductor dies, particularly "flip-chip" devices (see page 3 of specification, lines 15 et seq.).

As a final point with respect to the § 103 rejection, we note that appellants base no argument upon objective evidence of nonobviousness, such as unexpected results.

In conclusion, based on the foregoing, the examiner's rejections under 35 U.S.C. § 112, first and second paragraphs,

are reversed, whereas the examiner's rejection under 35 U.S.C. § 103 is sustained. Accordingly, the examiner's decision rejecting the appealed claims is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

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